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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/683,713	10/09/2003	Purakh Raj Verma	1016-031	2052

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EXAMINER	
DANG, TRUNG Q	

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 03/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/683,713	VERMA ET AL.	
	Examiner	Art Unit	
	Trung Dang	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-20 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) 1-20 is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on 09 October 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a)☐ All b)☐ Some * c)☐ None of:
1.☐ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/09/03.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Sadovnikov et al. (US 6,699,741).

With reference to Figs. 3A-3L, the prior art teaches the claimed invention in that it discloses a method of manufacturing a heterojunction bipolar transistor (HBT) comprising:

providing a semiconductor substrate having a collector region **316** (Fig. 3A);

forming an intrinsic base region **340** of a compound semiconductive material over the collector region (Fig. 3B, see col. 5, lines 36-37 for the compound semiconductor material of SiGe);

forming a reverse emitter window over a portion of the intrinsic base region (Fig. 3D);

forming an extrinsic base structure **352** over a remaining portion of the intrinsic base region (Fig. 3E);

processing the reverse emitter window to form an emitter window having a multi-layer reverse insulating spacer **364/342** therein (Figs. 3I-3J);

forming an emitter structure **374** in the emitter window (Fig. 3K);

forming an interlevel dielectric layer **376** over the collector region, extrinsic base structure and emitter structure (Fig. 3L); and

forming connections through the interlevel dielectric layer to the collector region, the extrinsic base structure, and the emitter structure (Fig. 2).

For claims 3 and 8, the intrinsic base region (region labeled "MONO" in Fig.3B) is considered to be selectively depositing or growing because it is formed of monocrystalline compound semiconductor selectively on the epitaxial collector region **316** (col. 5, lines 40-42). Furthermore, when the SiGe layer **340** is considered as the claimed intrinsic base region since layer **340** includes the intrinsic base region, the conformal deposition of layer **340** depicted in Fig. 3B (i.e., forming intrinsic base region) is a field deposition.

For claims 4 and 5, insulating layer 342 and insulating layer 344 in Fig. 3C read on the claimed first insulating layer and second insulating layer, respectively.

For claim 6, polysilicon layer 352 and oxide layer 354 in Fig. 3E read on the claimed first polysilicon layer and dielectric layer, respectively. Also, see polysilicon layer 370 in Fig. 3J for the claimed second polysilicon layer to form an emitter structure.

For the device claims 11-20, Fig.2 and related text discloses a heterojunction bipolar transistor structure comprising:

a semiconductor substrate having a collector region **216**;

an intrinsic base region **232** of a compound semiconductive material over the collector region;

a first polysilicon layer **234** over a portion of the intrinsic base region;

a dielectric layer **236** over the first polysilicon layer;

an emitter window over a portion of the intrinsic base region;

a multi-layer reverse insulating spacer **238** around the periphery of the emitter window;

an emitter structure **242** in the emitter window inward of the multi-layer reverse insulating spacer;

an extrinsic base structure **234** over a portion of the intrinsic base region **232** beside and spaced from the emitter structure;

an interlevel dielectric layer **376** (Fig.3L); and

connections **254**, **250**, **252** through the interlevel dielectric layer to the collector region, the extrinsic base structure, and the emitter structure.

For claims 13-14 and 18-19 concerning the intrinsic base region formed by a process as claimed, not withstanding the interpretation of selectivity as mentioned above which reads on the claims, applicants are reminded that a "product by process" claim is directed to the product per se, no matter how actually made. In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Thorpe, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in a "product by process" claims or not. Note that applicants have the burden of proof in such cases, as the above caselaw makes clear.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2, 7, 12, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sadovnikov et al. as above in view of Ohnishi et al. (US 6,674,149).

With respect to the claimed limitation regarding the material of the intrinsic base, Sadovnikov teaches the method and the structure as noted above except for the intrinsic base region is of silicon-germanium-carbon (SiGeC) or combination thereof as claimed.

Ohnishi teaches that SiGeC and SiC can be used in place of SiGe for the intrinsic base layer in a HBT device (col. 17, lines 17-22).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sadovnikov's teaching by forming the intrinsic base region **340** comprises SiGeC or SiC because SiGe, SiGeC, and SiC are recognized in the art as equivalent materials for the base region of a HBT device, and the substitution of one type of material for another art-recognized material to made the same would have been within the level of one skilled in the art. The combined process would result in the HBT device having the intrinsic base region of SiGeC.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 5 and 10 recites the limitations "the first insulating layer" and “the second insulating layer”. There is insufficient antecedent basis for these limitations in the claim.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trung Dang whose telephone number is 571-272-1857. The examiner can normally be reached on Mon-Friday 9:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Trung Dang

Trung Dang
Primary Examiner
Art Unit 2823

03/05/05